DOCUMENT RESUME

ED 170 205 SO 011 655

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TITLE Ordering Theory: A Methodology for Sequencing Stages of the Adoption Process.
PUB DATE [11 Apr 79]
NOTE 26p.; Paper presented at Annual Meeting of the American Educational Research Association (San Francisco, California, April 11, 1979) ; Best copy available

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Adoption (Ideas); *Change Agents; Change Strategies; Changing Attitudes; *Educational Change; *Educational Innovation; Educational Research; Elementary Secondary Education; *Learning Processes; Program Development; Research Methodology; Research Needs; Research Utilization; Teacher Attitudes; Teacher Role

ABSTRACT

This paper describes a method of research to examine the process of effecting educational change through adopting innovative ideas. Twenty-nine elementary teachers in the process of adopting a complex curricular innovation were studied. Because of the complex nature of this process, ordering theory was used as the method for analyzing the adoption stages. Ordering, a method of defining both linear and non-linear sequencing, measures both sequential skill development as well as the degree to which positive attitudes are necessary in the adoption process. Results indicate that adoption involves four levels: formation of a positive attitude toward the innovation, acquisition of general knowledge and concepts, a combination of further knowledge and increasing positive attitudes, and refinement of knowledge and use of the innovation. The use of ordering theory was deemed appropriate in that it provides a more thorough analysis of the research data. Utilization of this research methodology should change the nature of research efforts and the way in which innovations are introduced into school systems. (KC)

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ORDERING THEORY: A METHODOLOGY FOR SEQUENCING STAGES OF THE ADOPTION PROCESS

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SO 011 655

Paper presented at the annual meeting of the American Educational Research Association, San Francisco, April 11, 1979

Session # 24.22

ORDERING THEORY: A METHODOLOGY FOR SEQUENCING STAGES OF THE ADOPTION PROCESS

OVERVIEW

The American educational system today is characterized by an almost revolutionary spirit directed toward change. Never before in our history have so many people directed their time and energies toward alteration of the educational system. Yet, while millions of dollars have been spent on researching new and better ways to teach, developing new materials and providing inservice to teachers, few significant changes have been implemented in American schools (Goodlad and Kline, 1970).

There are a number of possible reasons for this failure to implement educational change. First, too much emphasis has been placed on the content of innovations rather than the processes of change (Miles, 1964; Paul, 1976; Sarason, 1971). There simply is not enough known about what happens as an innovation actually encounters a system in which it is to be installed (Miles, 1964). Second, various factors within schools and school settings may have obstructed change efforts. Some of these factors include: (a) incentive systems and bureaucratic structures (Pincus, 1974), (b) lack of sound managerial technologies (Pellegrin, 1975), (c) the organizational structure and development of educational institutions (Schmuck and Miles, 1971), and (d) the insufficient skills and unfavorable attitudes of the individuals who must actually implement the innovation (Giacquinta, 1973; Hall, 1974).

Recognizing that all of these reasons for failure to implement innovations could not be addressed in a single study, this research combines and examines two factors: (a) the change process, specifically the process of adopting innovations and (b) the lack of implementation skills and/or the unfavorable attitudes of those responsible for implementing change.

The Change Process

Change is the process of facilitating attainment of the goals of an organization or social system through introduction and implementation of new ideas. It is intentional (Rogers and Shoemaker, 1971) and consists of three major components: (a) an innovation, (b) which is disseminated to members of a social system (the diffusion process), (c) who decide to either implement or not implement the innovation (the adoption process).

The Role of the Individual

The unit of analysis in studying educational change has been from the perspective of either the individual, the school, or the school system. Several researchers (Bienenstok, 1965; Giacquinta, 1973; Hall, 1976) have suggested that educational change must be accepted and then implemented by the individual teacher and, therefore, the individual is the critical unit of analysis. Few people recognize the fact that change is only achieved when the individuals who must use the innovation make specific behavioral changes (Hall, 1976).

Purpose of the Study

The purpose of this study is to examine the adoption process by determining (a) the specific skills and attitudes necessary for an

individual member of an educational institution to implement an innovation and (b) the sequence for attaining those skills and attitudes. It is hypothesized that the skills and attitudes necessary for adoption are integrally related and hierarchically ordered, and failure to acquire these skills and attitudes will hamper adoption efforts.

BACKGROUND

The Adoption Process

The process an individual member of an organization goes through in accepting or rejecting an innovation is called the adoption process. It implies full use of the innovation and consists of stages or functions generally including knowledge and cognitive skill acquisition, attitude formation or change, evaluation, and decision making (Hassinger, 1959; Mason, 1962; Rogers, 1962; Rogers and Shoemaker, 1971).

A basic assumption made when studying the adoption process is that the stages or functions are sequentially ordered. Although researchers have disagreed on (a) the definition of activities occurring at each stage and (b) the order of the stages, a general contention has been that the adoption process is a sequential series of stages where information about an innovation is acquired, positive attitudes are built, implementation skills are learned, and a decision to adopt or reject the innovation is made (Havelock, 1969; Rogers and Shoemaker, 1971).

Validity of the Stage Concept

Several studies have been conducted to determine the existence of stages in adoption process and their sequential order. Rogers and

Shoemaker (1971) make the following generalization after reviewing 13 studies, "There are functions [stages] in the innovation-adoption process" (p. 124). While there is evidence to support the idea of stages, the number and order of the specific stages have varied from study to study. There is very little evidence as to exactly how many stages there are in the adoption process" (Rogers, 1962, p. 98).

One method of examining the sequential order of stages has been Guttman scalogram analysis. It is the methodology most typically used to determine whether or not a set of tasks/behaviors is sequential, i.e., unidimensional and cumulative, hence, forms a linear hierarchy (Airasian and Bart, 1975). Although this line of inquiry has provided a framework for sequencing tasks, it has been used with limited success to order the stages of the adoption process (Hurst, 1978; Mason, 1962; White, 1967).

There are a number of reasons which might explain why adoption stages have not scaled as predicted. First, methodological problems may account for some of the problems, i.e., recall of dates and events, failure to operationalize items which comprise the scales, reliability and validity. Second, the failure to scale as predicted may be due to the fact that the adoption stages do not form linear hierarchies, i.e., they may not be unidimensional. Therefore, reproducible Guttman scales would be impossible to achieve.

Ordering Theory

Conceptually, ordering theory draws heavily from scalogram analysis (Bart and Krus, 1973). However, while scalogram analysis is limited to

defining only linearly ordered task hierarchies, ordering theory can define the best fitting linear or non-linear hierarchical network among items and tasks.

A hierarchy describes the relationship of one task to another by indicating that mastery of one task in a sequence of tasks implies mastery of earlier sequential tasks, i.e., earlier tasks are prerequiste to later tasks. Airasian (1971), quoting other researchers, has suggested that in many subject areas the attainment of certain skills and abilities is dependent on the previous attainment of certain other skills and abilities. Therefore, when the learning of a new skill is desired, the sequential or hierarchical relationships between tasks should be considered.

Ordering theory methodologies are both theory generating and theory confirming (Airasian and Bart, 1975). They are theory generating to the extent that the limited amount of research in a field prohibits the a priori definition of a hierarchy. They are theory confirming to the extent that ordering theory can validate the existence of an a priori hierarchy. Therefore, an empirically derived hierarchy can be compared to an a priori hierarchy to determine the congruence between the two, thus leading to stronger validation of the a priori hierarchy (Airasian and Bart, 1975).

Summary

Adoption is the process an individual goes through when deciding to accept or reject an innovation. It consists of stages where knowledge and cognitive skills are built, attitudes are formulated or changed,

implementation skills are learned and an adoption/non-adoption decision is made. The adoption stages are hypothesized to be sequentially ordered or form a linear hierarchy, however, the research provides limited support for this contention.

Ordering theory is a method of defining both linear and non-linear hierarchical networks among tasks. Because of the complex nature of the adoption process, ordering theory may be a useful methodology for analyzing and sequencing the adoption stages.

METHOD OF INVESTIGATION

Research Question

1. Does the adoption process form a non-linear hierarchy?
2. What are the operational definitions of cognitive skills and attitudes acquired during adoption?
3. What is the "best fitting" hierarchy among the cognitive skills and attitudes required to adopt a curriculum innovation?

Sample

The sample consisted of 29 elementary school teachers in Toledo, Ohio, who were in the process of adopting a complex curricular innovation, Individually Guided Education (IGE). There were two men and 27 women of varying ages who had been teaching for different lengths of time.

The teachers in the sample were a heterogeneous group regarding their experiences with IGE. The 29 volunteer subjects had been implementing IGE for varying lengths of time and, therefore, had differing levels of cognitive skill and attitude acquisition regarding IGE. These

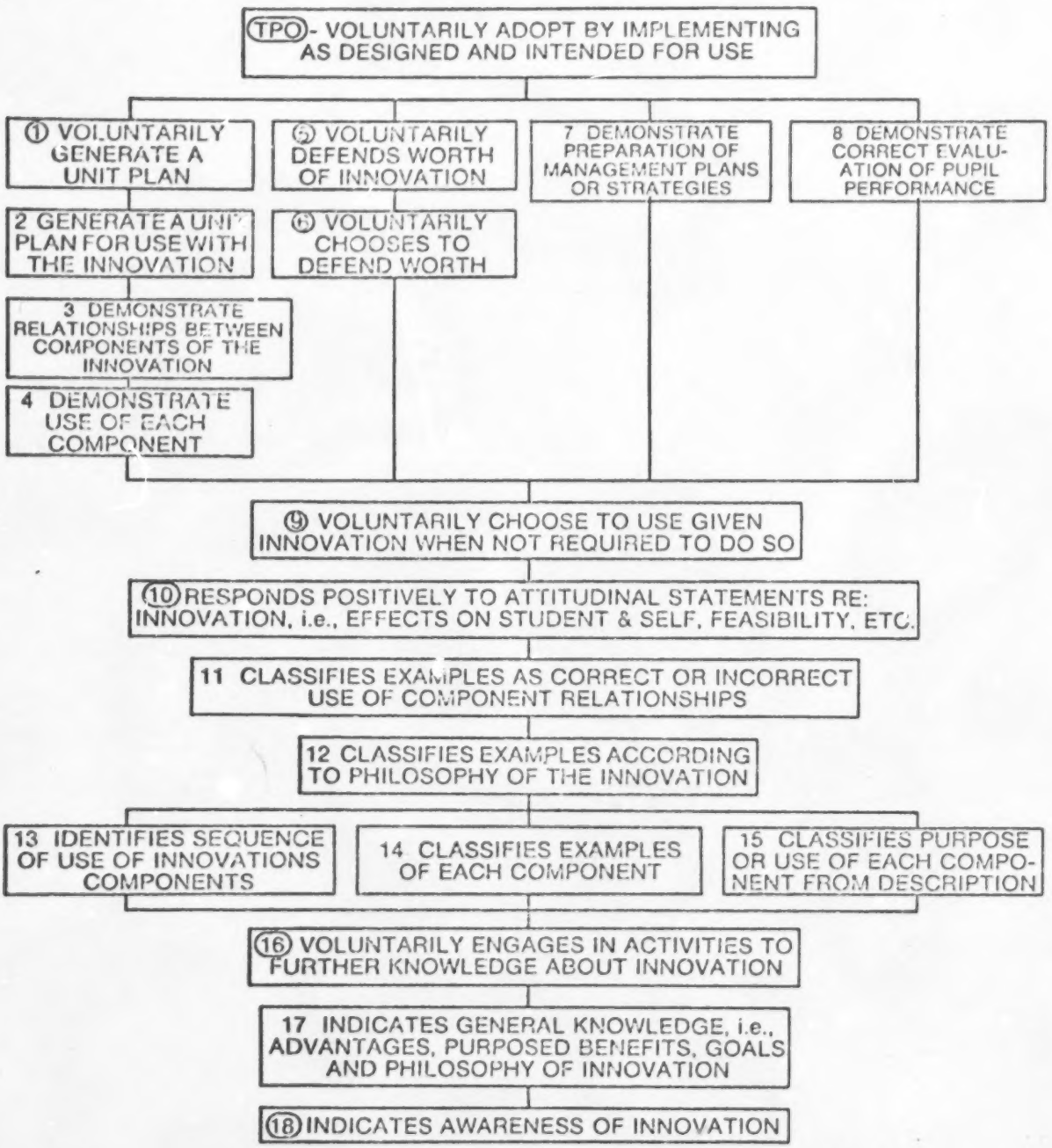
differences provided the dispersion of scores necessary to perform the data analysis.

Procedure

Developing the Hierarchy. One methodological problem with previous adoption studies is that the adoption stages have not generally been operationally defined. Therefore, a major goal of this study was to operationally define the cognitive skills and attitudes necessary for successful adoption to occur. Using conceptions of: (a) the adoption process proposed by Brickell (1966), Clark and Guba (1965), Mason (1962), Miles (1964), and Rogers and Shoemaker (1971) and (b) the taxonomic schemas of Gagné (1977) in the cognitive domain and Krathwohl, et al. (1964), in the affective domain, adoption was defined as the "voluntary acceptance and implementation of an educational innovation." This definition was then expanded to include criteria which further clarified acceptance and implementation of an educational innovation (see Appendix A).

Using this operational definition as a basis for generating the levels of the hierarchy and the task analysis procedure described by Gagné (1977), 18 prerequisite tasks/behaviors were identified. These behaviors were identified by starting with the terminal goal, i.e., voluntarily accepts and implements an educational innovation, and asking of each superordinate task/behavior, "What cognitive skills and attitudes must an individual possess in order to perform this higher level task?" This procedure provided a non-linear hierarchy of the general adoption process with operationally defined cognitive skills and attitudes. (see Figure 1).

FIG. 1 HIERARCHY I, HYPOTHESIZED HIERARCHY FOR THE ADOPTION PROCESS OF CURRICULAR INNOVATIONS


TPO - VOLUNTARILY ADOPT BY IMPLEMENTING AS DESIGNED AND INTENDED FOR USE
① VOLUNTARILY GENERATE A UNIT PLAN
⑤ VOLUNTARILY DEFENDS WORTH OF INNOVATION
7 DEMONSTRATE PREPARATION OF MANAGEMENT PLANS OR STRATEGIES
8 DEMONSTRATE CORRECT EVALUATION OF PUPIL PERFORMANCE
2 GENERATE A UNIT PLAN FOR USE WITH THE INNOVATION
⑥ VOLUNTARILY CHOOSES TO DEFEND WORTH
3 DEMONSTRATE RELATIONSHIPS BETWEEN COMPONENTS OF THE INNOVATION
4 DEMONSTRATE USE OF EACH COMPONENT
⑨ VOLUNTARILY CHOOSE TO USE GIVEN INNOVATION WHEN NOT REQUIRED TO DO SO
⑩ RESPONDS POSITIVELY TO ATTITUDINAL STATEMENTS RE: INNOVATION, i.e., EFFECTS ON STUDENT & SELF, FEASIBILITY, ETC.
11 CLASSIFIES EXAMPLES AS CORRECT OR INCORRECT USE OF COMPONENT RELATIONSHIPS
12 CLASSIFIES EXAMPLES ACCORDING TO PHILOSOPHY OF THE INNOVATION
13 IDENTIFIES SEQUENCE OF USE OF INNOVATIONS COMPONENTS
14 CLASSIFIES EXAMPLES OF EACH COMPONENT
15 CLASSIFIES PURPOSE OR USE OF EACH COMPONENT FROM DESCRIPTION
⑯ VOLUNTARILY ENGAGES IN ACTIVITIES TO FURTHER KNOWLEDGE ABOUT INNOVATION
17 INDICATES GENERAL KNOWLEDGE, i.e., ADVANTAGES, PURPOSED BENEFITS, GOALS AND PHILOSOPHY OF INNOVATION
⑱ INDICATES AWARENESS OF INNOVATION

○ Affective behaviors

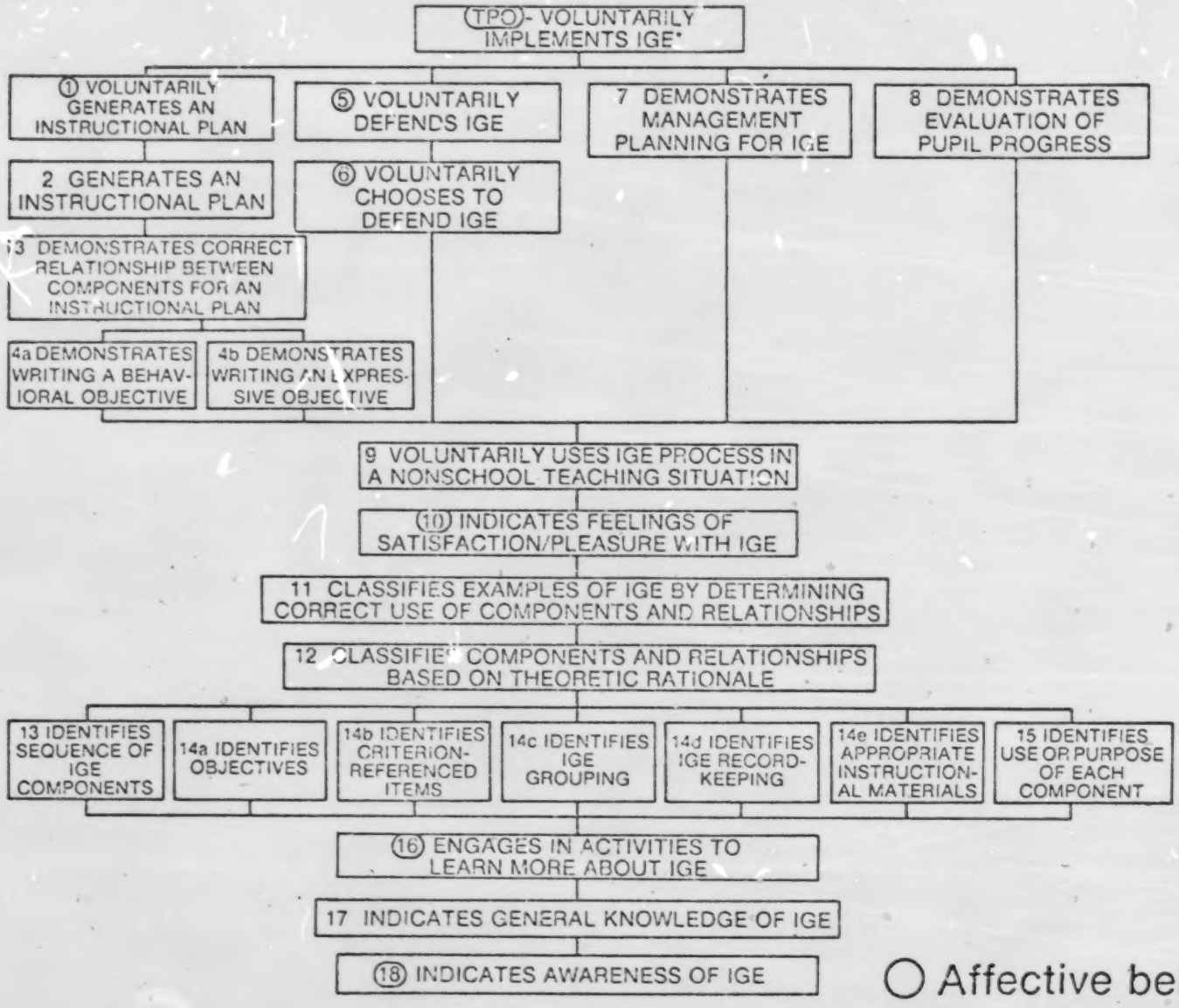
Using the general adoption hierarchy (Hierarchy I) as a guide, a second hierarchy (Hierarchy II) was constructed for a specific innovation, Individually Guided Education (IGE). The same task analysis procedure described above was used. Although conceptually these two hierarchies incorporate the same tasks/behaviors, operationally some tasks/behaviors of the IGE hierarchy were initially too broadly defined, i.e., required the performance of more than one skill. In such cases, that task/behavior was subdivided into component parts each consisting of one skill only. The resulting hierarchy consists of a terminal goal, voluntarily accepts and implements IGE, and 23 subordinate goals (see Figure 2).

Instrumentation. Criterion-referenced performance instruments were constructed to measure each cognitive skill and attitude identified in Hierarchy II. Four criterion referenced checklists, an interview schedule and a 64 item performance test were developed. Each of 29 teachers in the process of adopting IGE was (a) interviewed and observed while implementing IGE and (b) given the performance test.

Data Analysis

Ordering theory was used to determine the prerequisite relationships among the skills and attitudes and to construct the hierarchy. In order to determine the existence of a prerequisite relationship between pairs of items, each subject's score to each item was dichotomously scored (0 and 1). The response patterns between pairs of items were then analyzed to determine confirmatory and disconfirmatory responses. For example, if A is prerequisite to B, then the response patterns 1, 1 (both items correct), 0, 0 (both items incorrect) and 1, 0 (A correct,

FIG. 2 HIERARCHY II, HYPOTHESIZED HIERARCHY FOR THE ADOPTION OF INDIVIDUALLY GUIDED EDUCATION (IGE)


(TPO)- VOLUNTARILY IMPLEMENTS IGE*
① VOLUNTARILY GENERATES AN INSTRUCTIONAL PLAN
⑤ VOLUNTARILY DEFENDS IGE
7 DEMONSTRATES MANAGEMENT PLANNING FOR IGE
8 DEMONSTRATES EVALUATION OF PUPIL PROGRESS
2 GENERATES AN INSTRUCTIONAL PLAN
⑥ VOLUNTARILY CHOOSES TO DEFEND IGE
3 DEMONSTRATES CORRECT RELATIONSHIP BETWEEN COMPONENTS FOR AN INSTRUCTIONAL PLAN
4a DEMONSTRATES WRITING A BEHAV-IORAL OBJECTIVE
4b DEMONSTRATES WRITING AN EXPRES-SIVE OBJECTIVE
9 VOLUNTARILY USES IGE PROCESS IN A NONSCHOOL TEACHING SITUATION
⑩ INDICATES FEELINGS OF SATISFACTION/PLEASURE WITH IGE
11 CLASSIFIES EXAMPLES OF IGE BY DETERMINING CORRECT USE OF COMPONENTS AND RELATIONSHIPS
12 CLASSIFIES COMPONENTS AND RELATIONSHIPS BASED ON THEORETIC RATIONALE
13 IDENTIFIES SEQUENCE OF IGE COMPONENTS
14a IDENTIFIES OBJECTIVES
14b IDENTIFIES CRITERION-REFERENCED ITEMS
14c IDENTIFIES IGE GROUPING
14d IDENTIFIES IGE RECORD-KEEPING
14e IDENTIFIES APPROPRIATE INSTRUCTION-AL MATERIALS
15 IDENTIFIES USE OR PURPOSE OF EACH COMPONENT
⑯ ENGAGES IN ACTIVITIES TO LEARN MORE ABOUT IGE
17 INDICATES GENERAL KNOWLEDGE OF IGE
⑱ INDICATES AWARENESS OF IGE

○ Affective behaviors

B incorrect) would be expected, hence, they are confirming responses. However, the response pattern 0, 1 (A incorrect, B correct) would not be expected to occur, hence, a disconfirming response.

Theoretically, the number of disconfirmatory cases should be zero, however due to random error, this is rarely the case. Ordering theory, however, is a deterministic measurement model and as such does not allow for random error. Therefore, a preset tolerance level defining the number of disconfirmatory responses which will be accepted must be set; this tolerance level is based on the number of subjects and the number of items in the hierarchy. A tolerance level of .07 (2 disconfirmatory responses per item pair) was selected because it was assumed that a tolerance level of .03 (1 disconfirmatory response per item pair) would be too restrictive.

RESULTS

Table 1 presents the percentage of disconfirmatory responses for each two-item ordering. Reading across the table, any percentage less than the preset tolerance level (.07) indicates a prerequisite relationship. For example, the terminal skill (TPO) is prerequisite to two skills, 11 and 15. The percentage of disconfirmatory responses in both cases is three percent (.03). Using this procedure, all prerequisite relationships were determined and an empirical hierarchy was generated (Figure 3).

Although there are many specific differences between the hypothesized and empirical hierarchies, Hierarchy III confirms the hypothesis that the adoption process is a non-linear arrangement of cognitive skills and

Table 1

Matrix of Percentages of Disconfirmatory Response Patterns for Two-Objective Prerequisite Relation Orderings for the Adoption Process -- n = 29

	TPO	1	2	3	4a	4b	5	6	7	8	9	10	11	12	13	14a	14b	14c	14d	14e	15	16	17	18
TPO	--	14	24	24	45	52	62	55	69	14	31	72	03	48	38	62	55	52	55	52	03	72	62	79
1	00	--	10	24	38	45	48	48	55	14	28	59	03	38	31	55	48	45	48	48	03	59	55	64
2	00	00	--	17	28	34	45	45	45	14	17	52	03	34	31	45	41	38	38	38	03	55	45	52
3	07	21	24	--	31	31	52	45	52	10	14	62	00	41	34	48	48	38	38	38	00	62	45	59
4a	00	07	07	03	--	07	28	24	24	10	03	34	00	17	17	24	21	24	17	17	00	34	17	35
4b	10	17	17	07	10	--	31	24	28	07	03	38	03	17	21	28	24	24	14	17	00	38	21	38
5	00	00	07	07	10	10	--	07	17	03	07	10	00	10	03	10	21	17	14	14	00	14	17	21
6	07	14	21	14	21	17	21	--	31	10	14	24	03	21	03	21	21	28	10	21	03	28	21	34
7	00	00	00	00	00	00	10	10	--	03	00	14	00	03	07	10	07	10	03	03	00	14	07	14
8	14	28	38	28	55	48	66	52	72	--	34	76	07	48	34	62	55	55	48	52	03	76	69	76
9	07	17	17	07	24	21	45	38	45	10	--	52	00	31	31	34	41	38	31	28	00	55	38	52
10	00	00	03	07	07	07	00	00	10	03	03	--	00	03	00	03	10	07	07	07	00	03	07	10
11	10	24	34	24	52	52	69	59	76	14	31	79	--	52	41	62	59	55	59	55	00	79	69	83
12	07	10	17	17	21	17	31	28	31	07	14	34	03	--	24	24	31	31	24	24	00	34	31	38
13	07	14	24	21	31	31	34	21	45	03	24	41	03	34	--	38	34	38	28	34	03	41	38	48
14a	03	10	14	10	14	14	17	14	24	07	03	21	00	10	14	--	17	21	14	14	00	21	21	28
14b	03	10	14	14	14	14	31	17	24	03	14	31	00	21	14	21	--	14	17	17	00	28	17	31
14c	03	10	14	07	21	17	31	28	31	07	14	31	00	24	21	28	17	--	24	17	00	28	24	31
14d	14	21	21	14	21	14	34	17	31	07	14	38	10	24	17	28	28	31	--	21	07	38	24	41
14e	03	14	14	07	14	10	28	21	24	03	03	31	00	17	17	21	21	17	14	--	07	34	21	31
15	14	28	38	28	55	52	72	62	79	14	34	83	03	52	45	66	62	59	59	59	--	83	72	86
16	00	00	07	07	07	07	03	03	10	03	07	03	00	03	00	03	07	03	10	10	00	--	07	10
17	00	07	07	00	00	00	17	07	10	07	00	17	00	10	07	14	07	10	03	07	00	17	--	21
18	00	00	00	00	03	03	07	07	07	00	00	07	00	03	07	07	07	03	07	03	00	07	07	--

HIERARCHY III

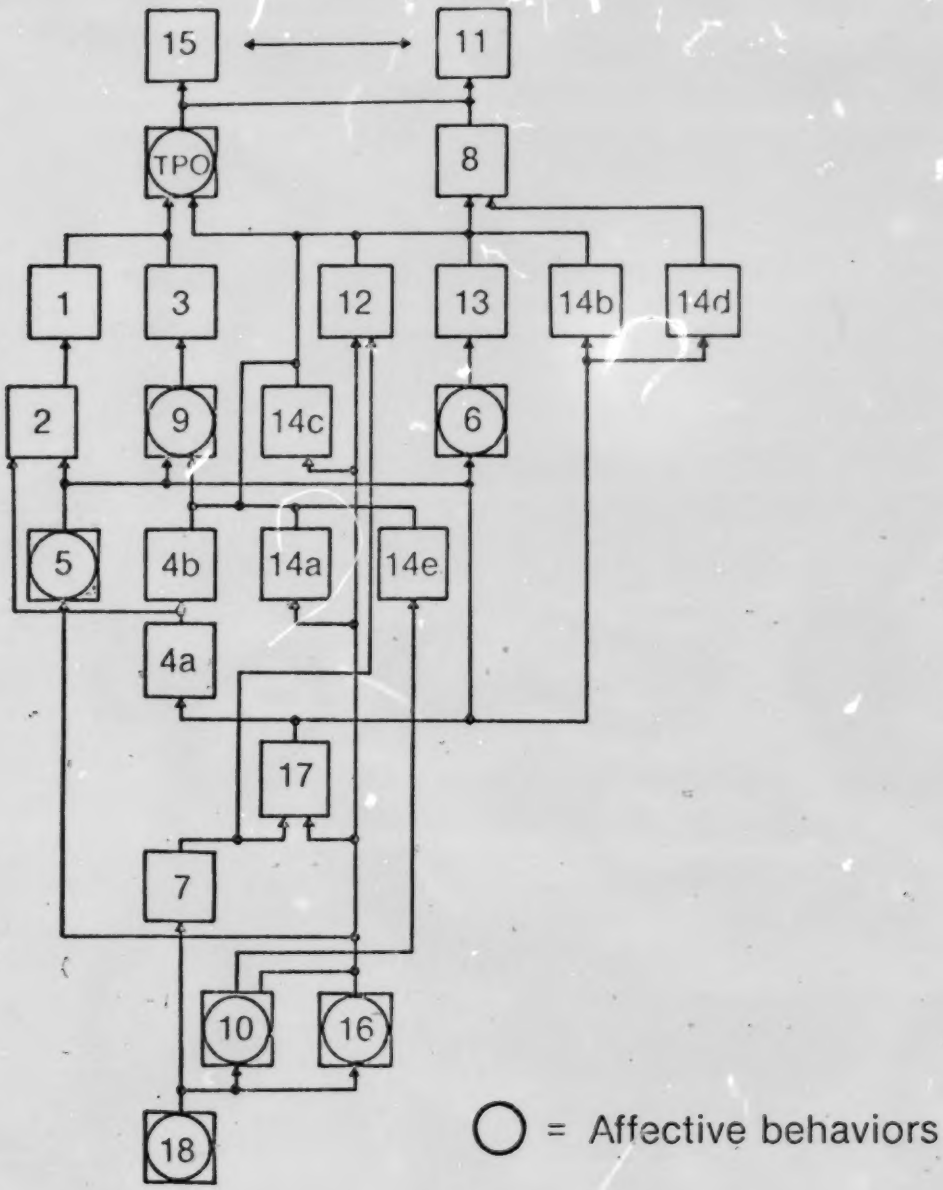


Fig. 3. Empirical Hierarchy of the Adoption Process of Individually Guided Education (IGE)

attitudes. Several methodological concerns lead the author to view some specific prerequisite relationships as unstable, hence, a "best fitting" hierarchical network was not constructed. In general, however, the adoption process appears to proceed in the following manner:

1. The first level of the hierarchy deals with forming a positive attitude toward IGE.

2. The second level is primarily concerned with the acquisition of general knowledge about IGE and concepts related to the use of IGE.

3. The third level is a mixture of cognition and affect. Additional concepts and higher order rules for using IGE are being acquired and at the same time positive attitudes toward IGE are being developed.

4. The final level of the hierarchy is cognitive. The skills indicate a more refined knowledge and use of IGE.

DISCUSSION

The use of ordering theory to explore the complexities of the adoption process was deemed appropriate for two primary reasons. First, ordering theory has the capability of analyzing all inter-task relationships. Unlike methods which analyze only those pairs of items hypothesized to be prerequisite, ordering theory has the capability of generating hierarchical sequences which were not hypothesized. This capability provides a much more thorough and complete analysis of the data.

Second, ordering theory has the special capability of defining non-linear hierarchical networks. Although the adoption process has been studied as a linear sequence, the research has produced conflicting data as to its unidimensional and cumulative nature. Ordering theory can

define linear as well as non-linear sequences, thus extending previous analysis techniques by locating and/or generating both linear and non-linear hierarchical sequences.

While ordering theory has some special capabilities absent in other hierarchical analysis techniques, it also poses some problems. These problems may have biased the results. First, Airasian (1978) states that ordering theory is best suited for validating hierarchical sequences with a relatively small number of elements. As the number of elements increases so does the possibility of error. This analysis of 24 elements proved to be quite cumbersome; the possibility of error can not be discounted. Hence, smaller segments of this or a comparable hierarchy should provide more reliable data.

Second, the difficulty indices, subject size, and tolerance level, as well as the number of skills analyzed, all affect chance occurrances of prerequisite relationships. Individual prerequisite connections may be unstable due to the small sample size, liberal tolerance level, and the large number of skills used in this study.

Conceptually, this study attempted to analyze the adoption process by operationally defining each cognitive skill and attitude necessary to adopt a given innovation. The immensity of such a task is readily apparent. This conceptualization represents a first best attempt, but is by no means perceived to be flawless.

The operational definitions coupled with the inclusion of both cognitive skills and attitudes in the same hierarchy represent a unique way of examining the adoption process. Since this line of research is in its infancy, well documented statements about the prerequisite nature

of specific skills and attitudes cannot be made. Therefore, it is suggested that the integrity of this research be maintained by focusing on the methodology of the study rather than on specific prerequisite relationships defining the adoption process.

SUMMARY AND CONCLUSIONS

The adoption of an innovation is a process similar to the process one goes through when any new learning occurs. Those people implementing an innovation must learn new skills and must form positive attitudes toward the innovation if those skills and attitudes are not already in their repertoire of behaviors. Therefore, when one adopts an innovation she/he must learn a new set of behaviors for implementing the innovation. These behaviors appear to fall in two major categories: (a) cognitive skills and (b) attitudes. Although previous adoption research has not looked at specific cognitive skills and attitudes necessary for adoption, most researchers agree that these behaviors are necessary and are components of the stages of the adoption process. These stages are also assumed to be linearly ordered although there is not significant data to support such a notion.

Building upon the idea that stages exist but are not necessarily sequential in nature, this research explored the possibility that the adoption of innovations is a non-linear process consisting primarily of cognitive skills and attitudes. Ordering theory was used to validate a hypothesized ordering.

It is concluded that both cognitive skills and attitudes are necessary for adoption and that these behaviors form a non-linear hierarchical

sequence leading to adoption. It is also concluded that ordering theory is a viable methodology for analyzing the non-linear order of these behaviors.

The exploratory nature of this research and the methodological problems encountered provide ideas and directions for further research rather than strong statements as to the order of cognitive skills and attitudes necessary for adoption. The major implications of this line of research are to (a) provide a methodology for studying the complexities of the adoption process and (b) provide change agents with a "means" for facilitating adoption. First, a validated hierarchy provides a sequence for the acquisition of skills and attitudes necessary for adoption. Second, it also provides a mechanism for detecting aborted change efforts, i.e., one can determine whether a given individual adopting an innovation lacks specific cognitive skills or attitudes necessary for adoption. Such knowledge of the requirements of adopting innovations may greatly change the nature of research efforts and the introduction of innovations into school systems.

References

Airasian, P. W. A method for validating sequential instructional hierarchies. Educational Technology, 1971, 11, 54-56.

Airasian, P. W. Personal communication, March 12, 1978.

Airasian, P. W., & Bart, W. M. Validating a priori instructional hierarchies. Journal of Educational Measurement, 1975, 12(3), 163-173.

Bart, W. M., & Krus, D. J. An ordering-theoretic method to determine hierarchies among items. Educational and Psychological Measurement, 1973, 33, 291-300.

Bienenstok, T. Resistance to educational innovation. The Elementary School Journal, 1965, 65, 420-428.

Brickell, H. M. The local school system and change. In R. Miller (Ed.), Perspectives on educational change. New York: Appleton-Century-Crofts, 1966.

Clark, D. L., & Guba, E. G. An examination of potential change roles in education. Bloomington, Indiana: The National Institute for The Study of Educational Change, 1965. (Unpublished Paper).

Gagné, R. M. The conditions of learning (3rd ed.). New York: Holt, Rinehart & Winston, 1977.

Giacquinta, J. B. The process of organizational change in schools. In F. N. Kerlinger (Ed.), Review of research in education (Vol. 1). Itasia, Illinois: F. E. Peacock, 1973.

Goodlad, J. I., & Klein, M. F. Behind the classroom door. Worthington, Ohio: Charles A. Jones, 1970.

Hall, G. E. The concerns-based adoption model: A developmental conceptualization of the adoption process within educational institutions. Austin, Texas: Texas University, Research and Development Center for Teacher Education, 1974. (ERIC Document Reproduction Service No. ED 111 791)

Hall G. E. The study of individual teacher and professor concerns about innovations. Journal of Teacher Education, 1976, 27(1), 22-23.

Hassinger, E. Stages in the adoption process. Rural Sociology, 1959, 24(1), 52-53.

Havelock, R. G. Planning for innovation through dissemination and utilization of knowledge. Ann Arbor, Michigan: The University of Michigan, Center for Utilization of Scientific Knowledge of the Institute for Social Research, 1969.

Hurst, B. M. The validation of a cognitive and affective hierarchy of the adoption process of educational change. Unpublished doctoral dissertation, The University of Toledo, 1978.

Krathwohl, D. R., Bloom, B. S. & Masia, B. B. Taxonomy of educational objectives: The classification of educational goals. Handbook II: Affective Domain. New York: David McKay, 1964.

Mason, R. An ordinal scale for measuring the adoption process. In E. Katz (Ed.), Studies of innovation and of communication to the public. Stanford, California: Stanford University Institute for Communication Research, 1962.

Miles, M. B. Educational innovation: The nature of the problem. In M. B. Miles (Ed.), Innovation in education. New York: Teachers College, Columbia University, 1964.

Paul, D. A. The diffusion of an innovation through interorganizational linkages. Educational Administration Quarterly, 1976, 12(2), 18-37.

Pellegrin, R. J. Problems and assumptions in the implementation of innovations. Journal of Research and Development in Education, 1975, 9(1), 93-101.

Pincus, J. Incentives for innovation in the public schools. Review of Educational Research, 1974, 44(1), 133-144.

Rogers, E. M. Diffusion of Innovations. New York: The Free Press, 1962.

Rogers, E. M., & Shoemaker, F. Communication of innovations: A cross cultural approach (2nd ed.). New York: The Free Press, 1971.

Sarason, S. B. The culture of the school and the problem of change. Boston: Allyn & Bacon, 1971.

Schmuck, R., & Miles, M. B.(Eds.). Organization development in schools. Palo Alto, California: National Press Books, 1971.

White, W. J. Toward the validation of a functional model of the adoption-rejection process. Unpublished doctoral dissertation, Michigan State University, 1967.

APPENDIX A

CRITERIA FOR ADOPTION OF CURRICULUM INNOVATIONS

A. Instructional

1. Teacher develops instructional plan for use of innovation.
2. Teacher effectively manages the innovation in the classroom.
3. Teacher sequences the components as specified by the innovation.
4. Teacher uses instructional strategies consistent with the innovation.
5. Teacher uses instructional materials congruent with the innovation.
6. Teacher uses the innovation for regular classroom instruction unless innovation is specifically intended for enrichment or remediation.
7. Teacher evaluates student learning/competencies as specified by the innovation.
8. Teacher communicates (explains, demonstrates) to students what students are to do.
9. Teacher roles (e.g., diagnostician, planner, purveyor of knowledge) are consistent with innovation.
10. Teacher-pupil relationship is consistent with innovation (e.g., use of aids for 1 to 1; 1 to several; openness; acceptance of pupil ideas; pupil decision-making allowed and encouraged, etc.).

B. Classroom Organization

1. Teacher organizes classroom space and facilities congruent with innovation (i.e., arranges for use of equipment and materials).

2. Teacher schedules classroom activities consistently with the innovation (i.e., variety; different for different students, flexibility of movement).

3. Teacher adjusts time allocations to be consistent with the innovation (i.e., 50-60 minute time blocks discarded if necessary; flexibility of scheduling with respect to time).

4. Teacher keeps records on student progress as specified by the innovation.

C. Attitudinal

1. Teacher perceives positive pupil growth as a consequence of using the innovation.

2. Teacher time, energy and effort with regard to innovation deemed worthwhile.

3. Teacher verbalizes willingness to devote time and effort to continued implementation.

4. Teacher perceives innovation as practical, feasible, workable.

5. Teacher perceives positive consequences for self (e.g., needs satisfaction, threat reduction, etc.) as consequence of using the innovation.